



HAL
open science

Critical gaps in the protection of the second largest exclusive economic zone in the world

Joachim Claudet, Charles Loiseau, Antoine Pebayle

► To cite this version:

Joachim Claudet, Charles Loiseau, Antoine Pebayle. Critical gaps in the protection of the second largest exclusive economic zone in the world. *Marine Policy*, 2021, 124, pp.104379. 10.1016/j.marpol.2020.104379 . hal-03090152

HAL Id: hal-03090152

<https://hal.science/hal-03090152v1>

Submitted on 29 Dec 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

DRAFT MANUSCRIPT

1

2

FINAL MANUSCRIPT AVAILABLE AT: <https://doi.org/10.1016/j.marpol.2020.104379>

3

4

5 **Title:** Critical gaps in the protection of the second largest exclusive economic zone in the world

6 **Running head:** Levels of protection matter

7 **Authors:** Joachim Claudet¹, Charles Loiseau¹, Antoine Pebayle¹

8 **Affiliations:**

9 ¹National Center for Scientific Research, PSL Université Paris, CRIOBE, USR 3278 CNRS-EPHE-UPVD,

10 Maison des Océans, 195 rue Saint-Jacques 75005 Paris, France; joachim.claudet@cnrs.fr;

11 loiseau.charles@gmail.com; antoinepeb@hotmail.fr

12 **Number of words in Abstract:** 257

13 **Number of words in Main text:** 2517

14 **Number of references:** 52

15 **Number of Figures:** 7

16 **Number of Tables:** 0

17 **Number of Appendices:** 2

18 **Corresponding author:** Joachim Claudet; joachim.claudet@cnrs.fr; National Center for Scientific

19 Research (CNRS), PSL Université Paris, CRIOBE (USR 3278 CNRS-EPHE-UPVD), Maison des Océans, 195

20 rue Saint-Jacques, 75005 Paris, France, Phone: +33 1 44 32 10 84

22 **Title:** Critical gaps in the protection of the second largest exclusive economic zone of the world

23 **Running head:** Levels of protection matter

24 **Highlights:**

- 25 • France aims to protect 30% of its marine territory by 2022, with 1/3 in strong protection.
- 26 • The 30% target is already exceeded but Ocean basins are unevenly represented.
- 27 • Only 1.6% of French marine territory falls within fully or highly protected areas.
- 28 • 80% of French full and high protection levels are concentrated in one territory
- 29 • Protection levels in Metropolitan France are lower than in overseas territories.

30 **One sentence summary:** Current efforts at protecting the second largest exclusive economic zone in
31 the world are unevenly distributed and are missing entire parts of ecosystems and Ocean basins.

32 **Abstract:** A healthy Ocean is critical for achieving sustainable development goals but the Ocean is
33 threatened by multiple stressors. There is a global call to increase the coverage of marine protected
34 areas (MPAs) from 10% to at least 30% by 2030. France, a major actor for marine conservation with
35 the second largest exclusive economic zone (EEZ) in the world, with territories in all oceans but the
36 Arctic, aims at reaching the 30% by 2022, for which one third shall include a strong protection status.
37 However, the strategy to reach this twofold target faces two challenges. First, while some standards
38 exist to classify the levels of protection, France is currently using a case specific, loose approach to
39 define strong protection. Second, there is no criteria that addresses the representativeness of the
40 protection across French Ocean basins. Here, we assess the protection levels of the 524 French MPAs
41 and their distribution across territories and habitats. While 33.7% of France's waters are covered by
42 an MPA, 12.5 % of these areas do not impose regulations stronger inside than outside. Full and high
43 levels of protection, the most effective for biodiversity conservation, represent only 1.6% of French
44 waters and are unevenly distributed across Ocean basins and habitats, with 80.5% concentrated in a
45 single territory. To fill this gap in protection for the second largest exclusive economic zone in the

46 world, it is critical that France's high ambition is both qualitatively and quantitatively deployed in each
47 Ocean basin to protect our ocean, its biodiversity and to sustain the livelihood of millions of people.

48 **Keywords:** conservation; UN Sustainable Development Goals; Convention on Biological Diversity;
49 Europe and overseas territories; marine policy

50

51

52 **Main text:**

53 **1. Introduction**

54 The Ocean is critical for human society as a whole. Many Sustainable Development Goals (SDGs)
55 benefit from achieving SDG 14 for a healthy ocean [1,2]. However, local and global assessments
56 consistently show that Ocean stressors are increasing [3], with direct exploitation of organisms, and
57 fishing as the most impactful stressor [4]. While new social norms should be developed to foster
58 sustainable development pathways [5,6], adaptation and mitigation strategies are still needed. Marine
59 protected areas (MPAs) are an effective area-based management tool in this respect and can help to
60 reach both ecological and social outcomes [7–9]. Member States Parties to the Convention on
61 Biological Diversity (CBD) agreed to cover 10% of their coastal and marine waters with MPAs by 2020
62 [10]. While this target has not been met [11], Member States Parties to the CBD are now discussing
63 options to raise their ambition and to cover at least 30% by 2030.

64 While the science supporting the usefulness of MPAs was mostly based on fully protected areas [12–
65 14], where all extractive activities are forbidden, the most recently established MPAs to meet the CBD
66 Aichi target 11 are partially protected [15,16]. Partially protected areas are often preferred over fully
67 protected areas as they can satisfy access to a broader range of users. However, partially protected
68 areas often lead to a concentration of allowed uses, even if regulated [17,18], thus sometimes
69 threatening biodiversity more than in unprotected areas [19,20].

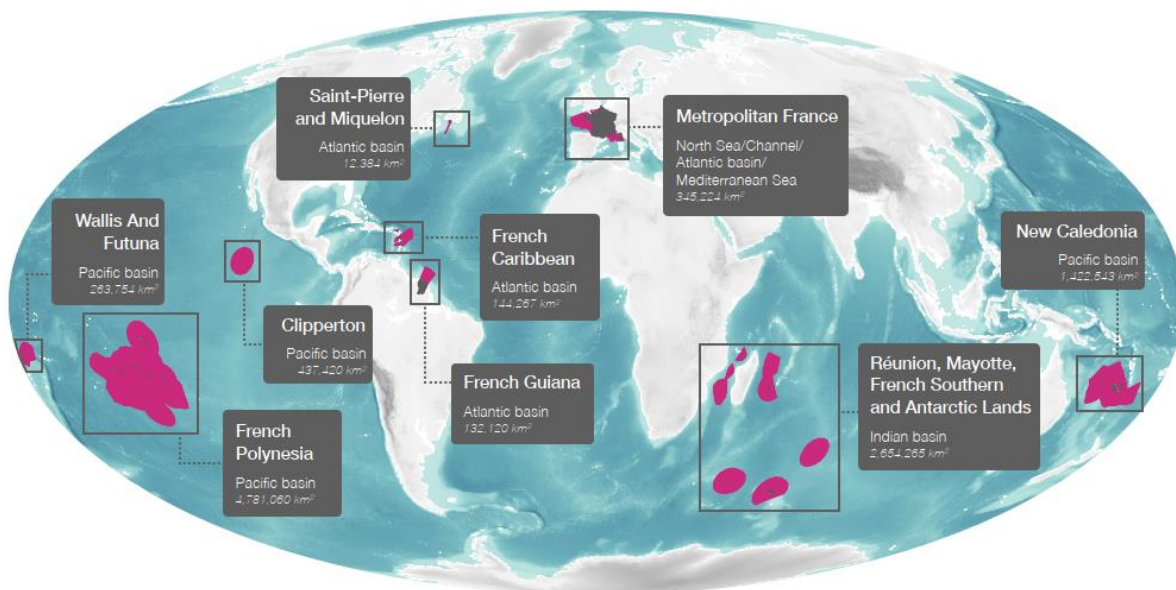
70 A recently developed regulation-based classification system for MPAs, now part of the Blue Parks
71 awarding system (<https://marine-conservation.org/blueparks/>) and integrated within the MPA Guide
72 (www.protectedplanet/c/mpa-guide), allows for MPAs to be classified and compared according to the
73 potential impacts on species and habitats authorized activities can have [21]. An assessment of
74 published literature on MPA effectiveness at the global scale with the application of this classification
75 system showed that, on average, MPAs delivered ecological benefits only for full protection (where all
76 forms of extractive activities are excluded) or high protection (allowing only infrequent use of some

77 types of non-industrial, highly selective, low impact, recreational, commercial or subsistence fishing
78 gears) [22]. A regional assessment in Hawaii showed the same pattern [23]. Protection levels are
79 therefore a good indicator of MPA performance [22] and can thus be used to assess conservation
80 strategies over large spatial scales [24].

81 France is a major actor for marine conservation. Due to its numerous Overseas Territories scattered
82 across the Ocean (but the Arctic basin; Figure 1), France possesses the second largest exclusive
83 economic zone (EEZ) in the world after the USA, covering 10,193,037 km², approximately 8% of the
84 total surface of all countries' EEZs. Following the release of the IPBES Global Assessment Summary for
85 Policymakers [4] in Paris on May 6th 2019, French President Macron called for an increase in MPAs,
86 with respect to both coverage and levels of protection, in France's coastal and marine waters. This
87 commitment was articulated at the first Ecological Defense Council held in Paris, on May 23rd, which
88 aimed to set guidelines for the ecological transition, including the preservation of biodiversity. France's
89 target is now to reach 30% of protected territory by 2022, for which one third shall have a strong
90 protection status [25]. In early 2019, France officially declared to the CBD 23.57% of its coastal and
91 marine territory was under protection (French Agency for Biodiversity, 2019). The challenge is thus
92 whether the new MPAs will help protect potential underrepresented territories and ecosystems
93 and whether the levels of protection of the so-called "strong" protection will be sufficient enough to
94 deliver the expected benefits to biodiversity.

95 <insert Figure 1 here>

10,193,037 km² of French marine territories across the Ocean



96

97 Figure 1: France's coastal and marine waters within its economic exclusive zone across the global Ocean.

98 Here, with a focus on France, which covers a large portion of global marine biodiversity within its EEZ
99 [26,27], which hosts a range of human pressures [28], and which features an extensive system of MPAs
100 with more than 564 protected sites, we critically assess whether the country's current conservation
101 efforts and its new quantitative and qualitative targets are appropriately strategized to deliver
102 ecological benefits.

103 2. Methods

104 We compiled information on legally binding MPAs from the French Agency for Biodiversity portal
105 (http://www.amp.afbiodiversite.fr/accueil_fr/ressources, 2020), the most complete database on
106 French MPAs. In the case of protected areas non-strictly marine, only the marine part was kept. All
107 identified 524 MPAs included in our study are reported to the CBD, thus counting toward international
108 biodiversity conservation targets. In the case of multiple-zone MPAs (n=20), MPAs were considered at
109 the zone level. We then collected information on allowed or prohibited activities from legal texts,
110 management plans and personal communication with MPA managers. Specific information from
111 Natura 2000 sites was also obtained from the European Environment Agency official website

112 (<https://www.eea.europa.eu/data-and-maps/data/natura-10>), but we cross-referenced it as in many
113 cases the information was outdated.

114 We then classified all MPAs, or zones in the case of multiple-zone MPAs, using the regulation-based
115 classification system [21]. We thus obtained a protection level for each of the 524 MPAs (or 564 zones).
116 Assigning a protection level to an MPA using the regulation-based classification system [21] consists in
117 walking through a decision tree, answering a maximum of four questions about the authorized uses
118 within the MPA. MPA protection levels range from Fully Protected, where no form of extractive
119 activities are present, Highly Protected, Moderately Protected, Poorly Protected, to Unprotected,
120 where activities with the greatest impact on species and habitats are not restricted inside the MPA. In
121 the case of MPAs which lacked a legal text or management plan in which regulations were established,
122 we assigned the MPAs to an additional non-regulated category.

123 Existing georeferenced information in the French Agency for Biodiversity portal was used. When
124 missing, in multiple instances, and for almost all zoning schemes in the case of multiple-zone MPAs,
125 additional information was obtained as detailed above for the regulations. To avoid overestimating
126 the total area covered by protection we removed overlapping areas, keeping only those conferring the
127 strongest levels of protection for each overlap. Exclusive Economic Zones were retrieved from Flanders
128 Marine Institute, Maritime Boundaries Geodatabase, version 10 (2018; Available online
129 at <https://doi.org/10.14284/319>). Marine habitat maps were retrieved from the European
130 Environment Agency European Nature Information System (EUNIS), Version 2007
131 (<http://eunis.eea.europa.eu/habitats.jsp>).

132 All analyses were conducted using QGIS v.2.18.0 and R [29]. Maps were generated using rworldmap
133 [30], sf [31] and tmap [32] packages. Figures were created using tidyr [33] and ggplot2 [34] packages.

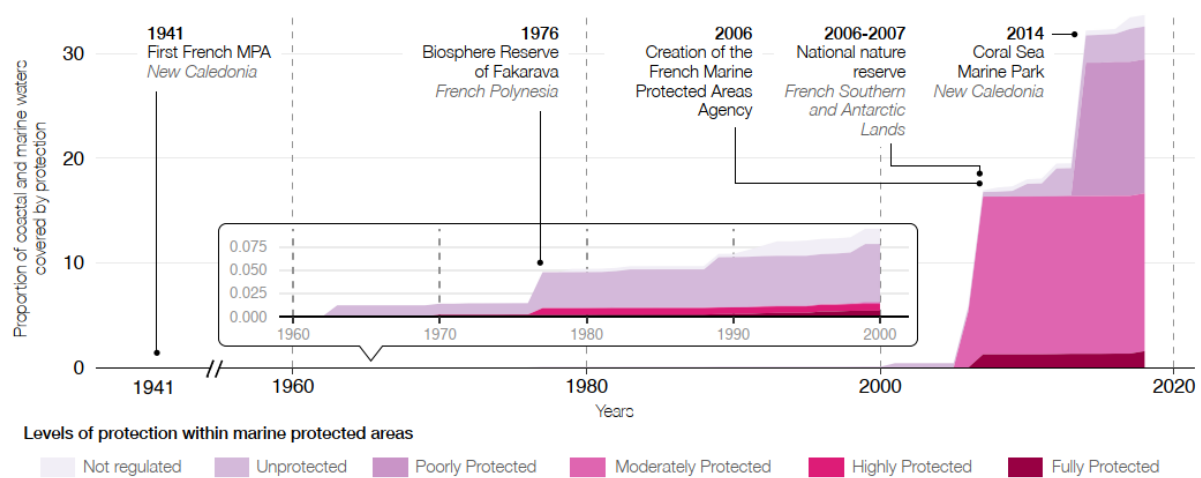
134 **3. Results and Discussion**

135 France has a long history of marine protection, with the first marine protected area (MPA) established
136 in the 1940's (Figure 2). While early MPAs often contained a portion under full protection, these

137 segments were typically few and small in size. A significant increase in number and size followed the
 138 creation of the French Marine Protected Area Agency in 2006 (Figure 2). This agency has now been
 139 integrated within the new French Agency for Biodiversity, established in 2020, and in charge of
 140 operationalizing the French strategy for MPAs.

141 <insert Figure 2 here>

Protection of French metropolitan and overseas waters through time

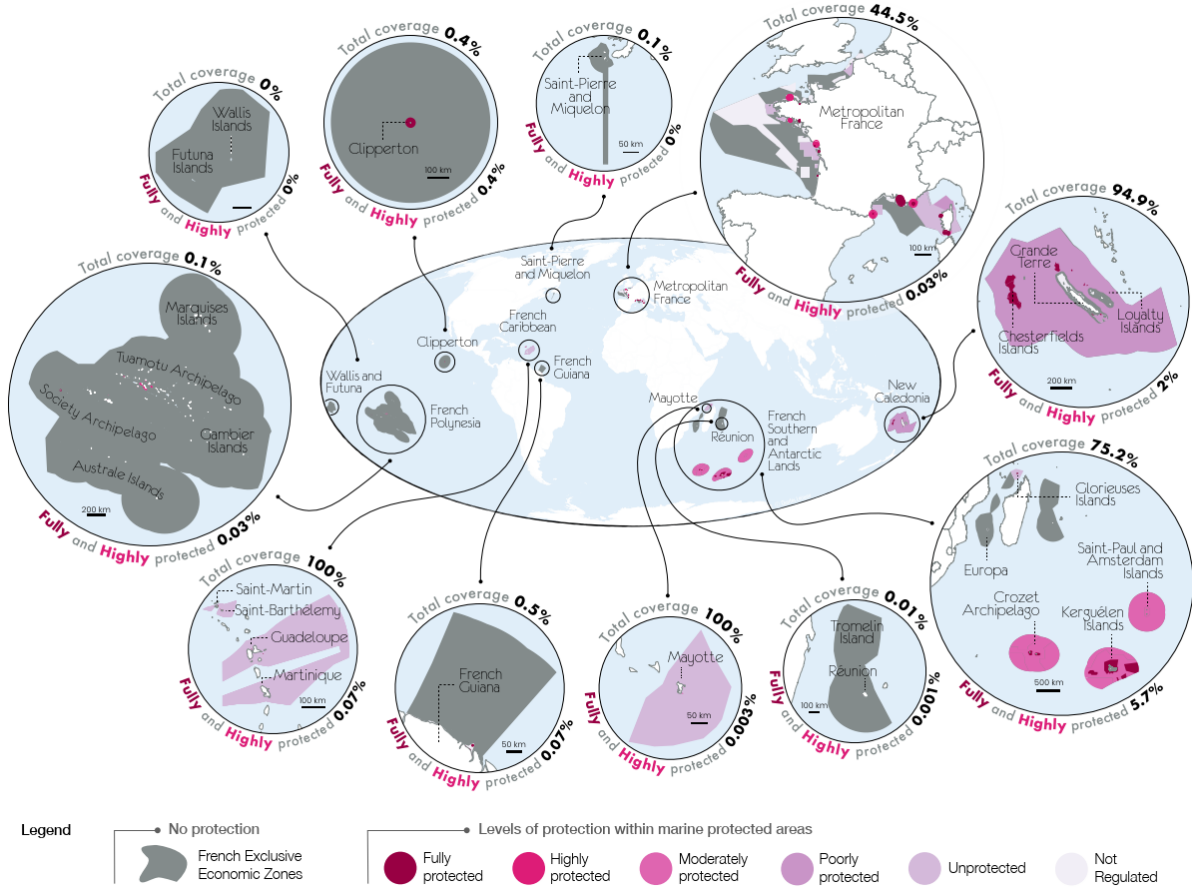


142
 143 Figure 2: Evolution of the coverage and protection levels of French marine protected areas through time. Colors correspond
 144 to the protection level within marine protected areas.

145 As of mid-2020, France has already reached its 30% target. Currently, 33.7% of France’s coastal and
 146 marine waters are under some level of protection. This figure is much higher than the global level,
 147 with the United Nations Environment Program's World Conservation Monitoring Centre (WCMC) and
 148 the International Union for the Conservation of Nature (IUCN) reporting 6.97% of global ocean
 149 protection as of 2017 [16]. In France, contrary to other parts of the world where paper parks can
 150 represent a large portion of declared efforts [24,35,36], only 3.3% of the areas designated as MPA
 151 cannot be considered implemented as no management plan or legal text could be found. However,
 152 more than 10% of the area declared as protected, although often actively managed, does not provide
 153 restrictions on activities that can impact biodiversity (Figure 3). Hence, for 13.5% of the French
 154 protected areas there is no difference in regulations between the inside and the outside.

155 <insert Figure 3 here>

Coverage of the different levels of protection in French metropolitan and overseas waters



156

157 Figure 3: Coverage the different levels of protection in France’s coastal and marine waters. Colors correspond to the
158 protection level within marine protected areas. Portions of exclusive economic zone not covered by a marine protected area
159 are depicted in grey. For each territory or region, both the total coverage of marine protected area and coverage of only full
160 and high protection are highlighted.

161 Full and high protection, known to deliver ecological benefits [22,23], cover only 1.58% of France’s
162 coastal and marine waters, close to an order of magnitude below the 10% target of “strong” protection
163 for 2022.

164 One of the most striking results of our assessment is that the global figures (across France’s global EEZ)
165 hardly depict the situation in each specific ocean basin, emphasizing the need for France’s integrated
166 target to be locally or regionally deployed in each ocean basin. Further, the overall effort is greatly

167 unbalanced since more than half of total marine protection, and more than 80% of full and high
168 protection, lay in French Southern and Antarctic Lands' waters (Figure 4; Figure 5).

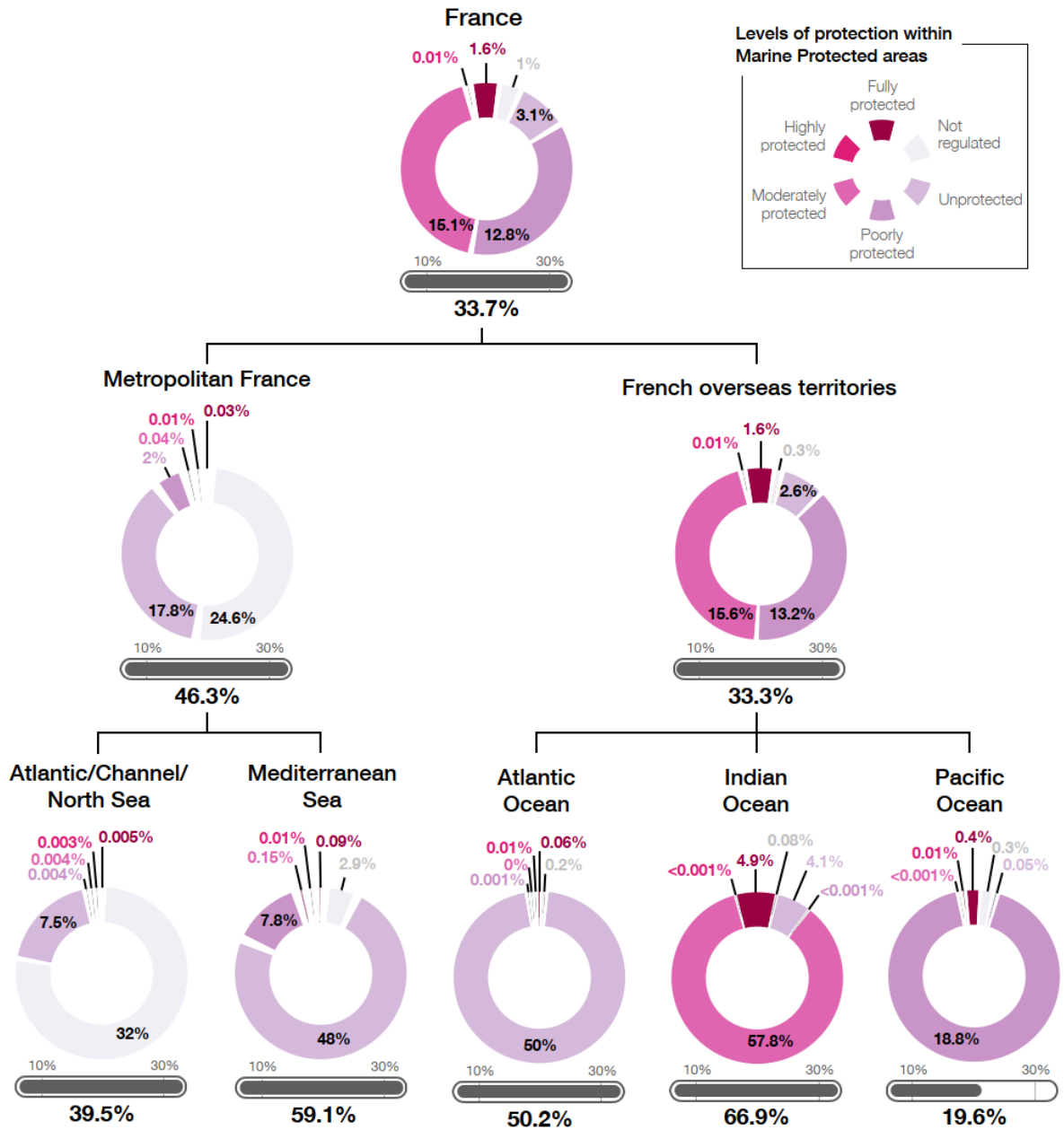
169 In Metropolitan France, while 59.1% of the French Mediterranean is covered by MPAs, full and high
170 protection represent only 0.09% and 0.01% of the basin, respectively. The pattern is similar in the other
171 Metropolitan France basin, the French Atlantic - Channel - North Sea basin, where while MPAs
172 represent up to 39.5% of its surface, only 0.005% and 0.003% are under full and high protection,
173 respectively. If France's 10% target of "strong" protection was designed to only capture full and high
174 levels of protection, and was only adopted per Ocean basin rather than at the global EEZ scale, France's
175 two metropolitan Ocean basins would fall short of meeting the target by two to three orders of
176 magnitude. In other words, full and high protection of the Mediterranean and Atlantic - Channel -
177 North Sea basins should be increased by 100 and 1,000 fold, respectively.

178 In France, the EEZ of some territories may be embedded at 100% within an MPA (e.g. Mayotte in the
179 Indian Ocean and all of the French Caribbean Islands), but with protection levels conferring only poor
180 protection (Figure 5). Others, like Clipperton, in the Pacific Ocean, are covered only by full protection
181 (Figure 5). It should be noted that the strongest levels of protection occur in those territories that are
182 both the most remote from urban centers and where France sovereignty is disputed with other
183 countries, such as Clipperton with Mexico and some islands of the French Southern and Antarctic Lands
184 with Madagascar. While these areas host remarkable ecosystems that clearly deserve full and high
185 protection [37,38], the overrepresentation of the strongest levels of protection in those areas might
186 reflect geopolitics [39] and ease of establishment [40].

187 <insert Figure 4 here>

188 <insert Figure 5 here>

Distribution of the different levels of protection in France across Ocean basins



189

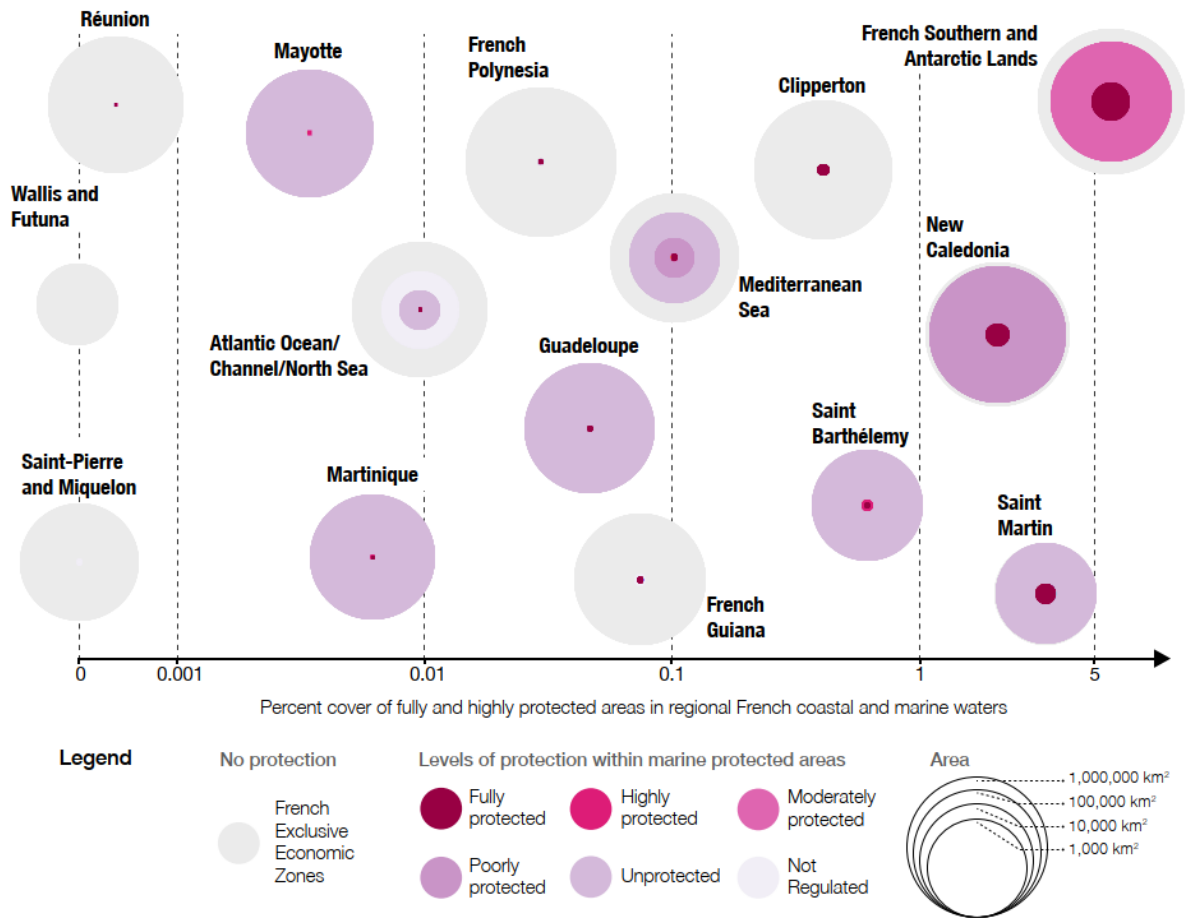
190 Figure 4: Distribution of the different levels of protection in France’s coastal and marine waters across France’s Ocean basins.

191 Percentages below the progress bars indicate the overall percent cover of protection in the corresponding grouping,

192 percentages in the colored pie-charts show how the different levels of protection are distributed in the corresponding

193 grouping.

Proportion and distribution of levels of protection in French waters



194

195 Figure 5: Distribution of protection levels per French territory. The area of the coastal and marine waters of each French
 196 territory or region is depicted by a grey circle in a logarithmic scale, within which the proportion of the different levels of
 197 protection (relative to the corresponding coastal and marine waters surface area) are depicted by circles of different colors.
 198 Circles are ranked horizontally along an increasing gradient of the proportion of fully and highly protected area against the
 199 coastal and marine waters area in each region/territories.

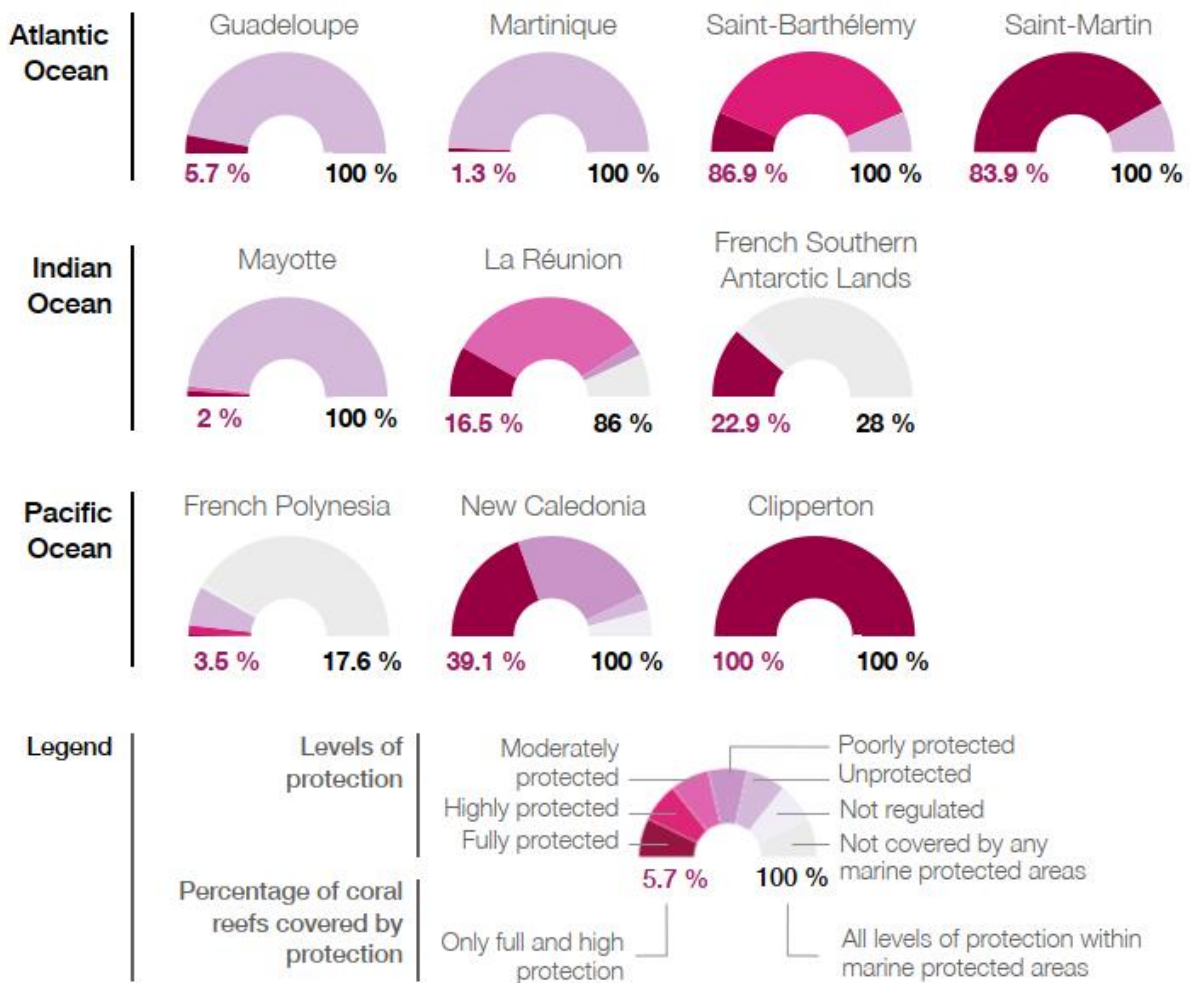
200 The CBD Aichi target 11 stipulates that protected areas have to be “ecologically representative” [10].
 201 In France, we have seen that marine ecoregions (or Ocean basins) are not equally nor evenly protected
 202 (Figure 4, Figure 5). The pattern is the same within Ocean basins. Among marine habitats, coral reefs
 203 are by far the most protected. France aims to protect 75% of its coral reefs by 2021 and 100% by 2025
 204 (Plan Biodiversité). As of 2020, 65.2% of French coral reefs falls within an MPA (Figure 6). However,
 205 the protection levels vary greatly from one territory to another with, for instance, 86.9% and 83.9% of
 206 coral reefs within full and high protection in Saint-Barthélemy and Saint-Martin, respectively, while

207 only 1.3% and 2% are under full and high protection in Martinique or Mayotte, respectively (Figure 6).

208 The larger the coral reef extent in a given territory, the lower the protection level.

209 <insert Figure 6 here>

Levels of protection in French coral reefs



210

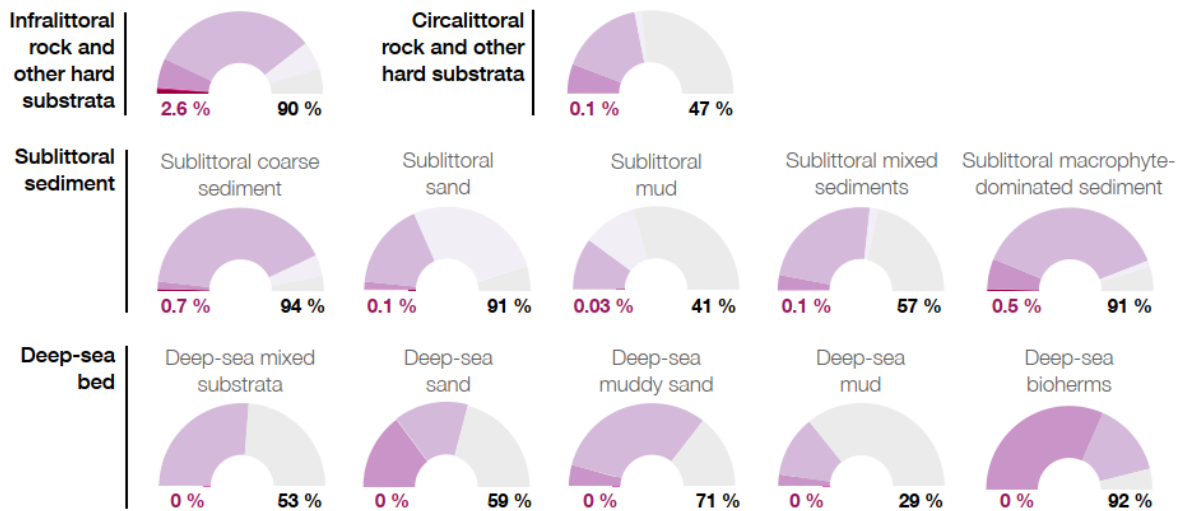
211 Figure 6: Proportion of coral reefs within marine protected areas, by protection level, in France’s overseas territories. Black
 212 percentages show how much of the corresponding habitat is protected by any protection level. Colored percentages show
 213 how much of the habitat is protection by full and high protection levels.

214 In the French Mediterranean Sea, rocky substrates are the marine habitats that receive the most, if
 215 not all, full and high protection (Figure 7). However, the fraction of these habitats protected under
 216 such regimes remains low, with 2.7% of rocky substrates under full or high protection status. Only

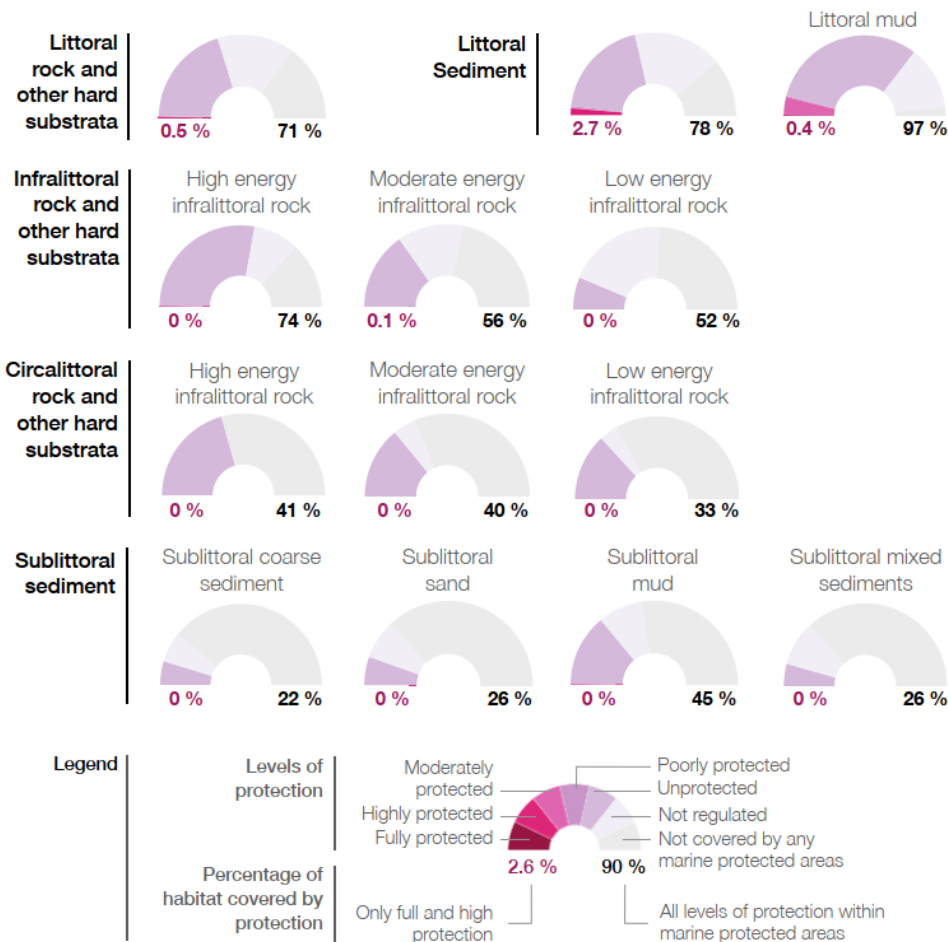
217 1.43% of subtidal soft bottoms are covered by full or high protection. Deep habitats, while particularly
218 vulnerable and valuable [41], never receive similar full or high levels of protection. In the French
219 Atlantic – Channel – North Sea basin, only intertidal habitats (mostly sandy habitats) receive some full
220 or high protection (Figure 7). None of the other habitats harbor differences in regulations for
221 potentially impactful use between inside and outside the protected areas.

222 <insert Figure 7 here>

Levels of protection in French Mediterranean Sea habitats



Levels of protection in French Atlantic Ocean, Channel and North Sea habitats



223

224 Figure 7: Proportion of French Mediterranean, Atlantic, Channel and North Sea basin habitats within marine protected areas,

225 by protection level. Black percentages show how much of the corresponding habitat is protected by any protection level.

226 Colored percentages show how much of the habitat is protection by full and high protection levels.

227 Here, we mostly assessed the representation component of the CBD Aichi target 11 and the new
228 French strategy for MPAs. Other aspects such as effective and equitable management, or connectivity,
229 are also critical in the delivery of ecological and social outcomes [42–44]. Such information is still
230 lacking in many regions of the world [45]. While close to half of the MPAs globally are not implemented
231 but only proposed or designated [16], we identified only 1% of France’s coastal marine waters within
232 MPAs without legal or management texts. While this does not reflect the effectiveness of
233 management, nor the compliance levels, France’s determination to achieve effective management can
234 be observed through the increasing number of French MPAs on the IUCN Green List or receiving a Blue
235 Parks award (formally Global Ocean refuge System) [46,47].

236 President Macron’s ambitions to further develop and expand France’s MPAs is very promising news
237 for biodiversity conservation. However, to translate this desire into the delivery of tangible benefits
238 depends directly on the sub-targets and clear definitions that are attached to these protection levels.
239 First, and most importantly, in order to avoid to repeat the deep gaps between MPA coverage and
240 effective protection levels such as in the under-protected Mediterranean Sea [24], it is of utmost
241 importance to ensure the actual protection levels behind the 10% “strong” protection can lead to a
242 sea use change that is meaningful for biodiversity conservation [25]. In this respect, we advocate that
243 France adopts the recently developed international standards for MPA classification, such as the
244 regulation-based classification system for MPAs [21], now integrated in the soon to be released MPA
245 Guide (www.protectedplanet.net/c/mpa-guide), where full and high protection are the levels
246 recognized to deliver the benefits MPAs are expected to deliver [8,13,14,22,48–50]. France is currently
247 using case specific criteria to define strong protection (called Measure M003), which is typically not
248 more restrictive than the simple definition of an MPA according to the standards of the International
249 Union for the Conservation of Nature (<https://www.iucn.org/commissions/world-commission-protected-areas/our-work/marine/marine-protected-areas-global-standards-success>).

251 Second, unless we consider that the French 2022 30% target is already met, as is the case when
252 computed over the whole French coastal and marine waters, this quantitative areal target (together
253 with its “strong” protection counterpart) should only be considered met if reached for each French
254 ocean basin. Only this would ensure ecological representativeness [51] and would help to distribute
255 the socio-economic benefits of conserving biodiversity more evenly across French territories [43].

256 As in other parts of the world, where weak regulations cannot deliver ecological outcomes [20,52,53],
257 or where protected areas are not properly resourced or managed [36,54], it is important to ensure
258 that the race to meet key biodiversity targets does not lead us to a false sense of security about
259 appropriate actions being undertaken [55–58]. We believe that classifying MPAs according to their
260 protection levels, such as we did here, is a much needed step towards shedding light on our actual
261 insufficient efforts at managing human uses of nature [59]. We hope this will translate into a greater
262 desire by our policy-makers to establish and appropriately manage MPAs with protection levels that
263 are able to deliver tangible benefits for biodiversity conservation [60]. To truly fill the gaps in the
264 protection of the second largest exclusive economic zone of the world, appropriate levels of protection
265 in all Ocean basins are critical to protect our ocean, its biodiversity and to sustain the livelihood of
266 millions of people.

267 **4. Acknowledgements**

268 We thank Vincent Toison for the French Agency for Biodiversity for useful discussions on assignments
269 of protection levels on some specific MPAs. We wish to thank the Ocean and Climate Platform who
270 facilitated discussion about those results with French authorities prior of their publication. We also
271 thank Barbara Horta e Costa, Karim Erzini and Emanuel Gonçalves for the role they played in the
272 development of the Regulation-Based Classification System.

273 **5. Funding**

274 Support for this project was provided by Agence Nationale de la Recherche (ANR-14-CE03-0001-01)
275 and The Pew Charitable Trusts.

276 **6. Author contributions**

277 J.C. designed the study. C.L. and A.P. compiled the data. J.C. and C.L. analyzed the data. J.C. and C.L.
278 produced the figures. J.C. wrote the manuscript. All authors approved the manuscript.

279 **7. Competing interests**

280 The authors have no competing interests to declare.

281 **8. References**

- 282 [1] G.G. Singh, A.M. Cisneros-Montemayor, W. Swartz, W. Cheung, J.A. Guy, T.-A.A. Kenny, C.J.
283 McOwen, R. Asch, J.L. Geffert, C.C.C.C. Wabnitz, R. Sumaila, Q. Hanich, Y. Ota, A rapid
284 assessment of co-benefits and trade-offs among Sustainable Development Goals, *Mar. Policy*.
285 93 (2018) 223–231. <https://doi.org/https://doi.org/10.1016/j.marpol.2017.05.030>.
- 286 [2] J. Claudet, L. Bopp, W.W.L.L. Cheung, R. Devillers, E. Escobar-Briones, P. Haugan, J.J. Heymans,
287 V. Masson-Delmotte, N. Matz-Lück, P. Miloslavich, L. Mullineaux, M. Visbeck, R. Watson, A.M.
288 Zivian, I. Ansorge, M. Araujo, S. Aricò, D. Bailly, J. Barbière, C. Barnerias, C. Bowler, V. Brun, A.
289 Cazenave, C. Diver, A. Euzen, A.T. Gaye, N. Hilmi, F. Ménard, C. Moulin, N.P. Muñoz, R.
290 Parmentier, A. Pebayle, H.-O. Pörtner, S. Osvaldina, P. Ricard, R.S. Santos, M.-A. Sicre, S.
291 Thiébaud, T. Thiele, R. Troublé, A. Turra, J. Uku, F. Gaill, A Roadmap for Using the UN Decade
292 of Ocean Science for Sustainable Development in Support of Science, Policy, and Action, *One*
293 *Earth*. 2 (2020) 34–42. <https://doi.org/https://doi.org/10.1016/j.oneear.2019.10.012>.
- 294 [3] J.-B. Jouffray, R. Blasiak, A. V. Norström, H. Österblom, M. Nyström, The Blue Acceleration:
295 The Trajectory of Human Expansion into the Ocean, *One Earth*. 2 (2020) 43–54.
296 <https://doi.org/10.1016/j.oneear.2019.12.016>.
- 297 [4] IPBES, Summary for policymakers of the global assessment report on biodiversity and
298 ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and
299 Ecosystem Services., 2019. <https://ipbes.net/ga/spm>.

- 300 [5] S.H.M.M. Butchart, M. Walpole, B. Collen, A. van Strien, J.P.W.W. Scharlemann, R.E.A. a
301 Almond, J.E.M.M. Baillie, B. Bomhard, C.C. Brown, J. Bruno, K.E. Carpenter, G.M. Carr, J.
302 Chanson, A.M. Chenery, J. Csirke, N.C. Davidson, F. Dentener, M. Foster, A. Galli, J.N.
303 Galloway, P. Genovesi, R.D. Gregory, M. Hockings, V. Kapos, J.-F.F. Lamarque, F. Leverington,
304 J. Loh, M.A. McGeoch, L. McRae, A. Minasyan, M. Hernández Morcillo, T.E.E.E. Oldfield, D.
305 Pauly, S. Quader, C. Revenga, J.R. Sauer, B. Skolnik, D. Spear, D. Stanwell-Smith, S.N. Stuart, A.
306 Symes, M. Tierney, T.D. Tyrrell, J.-C.C. Vié, R. Watson, M.H. Morcillo, T.E.E.E. Oldfield, D.
307 Pauly, S. Quader, C. Revenga, J.R. Sauer, B. Skolnik, D. Spear, D. Stanwell-Smith, S.N. Stuart, A.
308 Symes, M. Tierney, T.D. Tyrrell, J.-C.C. Vié, R. Watson, M. Hernández Morcillo, T.E.E.E.
309 Oldfield, D. Pauly, S. Quader, C. Revenga, J.R. Sauer, B. Skolnik, D. Spear, D. Stanwell-Smith,
310 S.N. Stuart, A. Symes, M. Tierney, T.D. Tyrrell, J.-C.C. Vié, R. Watson, Global biodiversity:
311 Indicators of recent declines, *Science* (80-.). 328 (2010) 1164–8.
312 <https://doi.org/10.1126/science.1187512>.
- 313 [6] K.L. Nash, C. Cvitanovic, E.A. Fulton, B.S. Halpern, E.J. Milner-Gulland, R.A. Watson, J.L.
314 Blanchard, Planetary boundaries for a blue planet, *Nat. Ecol. Evol.* 1 (2017) 1625–1634.
315 <https://doi.org/10.1038/s41559-017-0319-z>.
- 316 [7] B.S. Halpern, S.E. Lester, K.L. McLeod, Placing marine protected areas onto the ecosystem-
317 based management seascape, *Proc. Natl. Acad. Sci.* 107 (2010) 18312–18317.
318 <https://doi.org/10.1073/pnas.0908503107>.
- 319 [8] J. Lubchenco, K. Grorud-Colvert, Making waves: The science and politics of ocean protection,
320 *Science* (80-.). 350 (2015) 382 LP – 383.
321 <http://science.sciencemag.org/content/350/6259/382.abstract>.
- 322 [9] J.M. Reimer, R. Devillers, J. Claudet, Benefits and gaps in use of area-based management tools
323 for the ocean Sustainable Development Goal., *Nat. Sustain.* (n.d.).
- 324 [10] CBD, COP 10 (Decision X/2 Strategic Plan for Biodiversity 2011-2020) Convention on Biological

- 325 Diversity. Nagoya, Japan., (2010). <https://www.cbd.int/decision/cop/?id=12268>.
- 326 [11] S.L. Maxwell, V. Cazalis, N. Dudley, M. Hoffmann, A.S.L. Rodrigues, S. Stolton, P. Visconti, S.
327 Woodley, N. Kingston, E. Lewis, Area-based conservation in the twenty-first century, *Nature*.
328 586 (2020) 217–227. <https://doi.org/10.1038/s41586-020-2773-z>.
- 329 [12] J. Lubchenco, S.R. Palumbi, S.D. Gaines, S. Andelman, Plugging a hole in the ocean: The
330 emerging science of marine reserves, *Ecol. Appl.* 13 (2003) S3–S7.
331 [https://doi.org/10.1890/1051-0761\(2003\)013\[0003:PAHITO\]2.0.CO;2](https://doi.org/10.1890/1051-0761(2003)013[0003:PAHITO]2.0.CO;2).
- 332 [13] J. Claudet, C.W. Osenberg, L. Benedetti-Cecchi, P. Domenici, J.A. García-Charton, Á. Pérez-
333 Ruzafa, F. Badalamenti, J. Bayle-Sempere, A. Brito, F. Bulleri, J.M. Culioli, M. Dimech, J.M.
334 Falcón, I. Guala, M. Milazzo, J. Sánchez-Meca, P.J. Somerfield, B. Stobart, F. Vandeperre, C.
335 Valle, S. Planes, Marine reserves: Size and age do matter, *Ecol. Lett.* 11 (2008) 481–489.
336 <https://doi.org/10.1111/j.1461-0248.2008.01166.x>.
- 337 [14] S.E. Lester, B.S. Halpern, K. Grorud-Colvert, J. Lubchenco, B.I. Ruttenberg, S.D. Gaines, S.
338 Airamé, R.R. Warner, Biological effects within no-take marine reserves: A global synthesis,
339 *Mar. Ecol. Prog. Ser.* 384 (2009) 33–46. <https://doi.org/10.3354/meps08029>.
- 340 [15] J. Claudet, Six conditions under which MPAs might not appear effective (when they are), *ICES*
341 *J. Mar. Sci.* 75 (2018) 1172–1174. <https://doi.org/10.1093/icesjms/fsx074>.
- 342 [16] E. Sala, J. Lubchenco, K. Grorud-Colvert, C. Novelli, C. Roberts, U.R. Sumaila, Assessing real
343 progress towards effective ocean protection, *Mar. Policy.* 91 (2018) 11–13.
344 <https://doi.org/10.1016/j.marpol.2018.02.004>.
- 345 [17] M. Zupan, F. Bulleri, J. Evans, S. Fraschetti, P. Guidetti, A. Garcia-Rubies, M. Sostres, V.
346 Asnaghi, A. Caro, S. Deudero, R. Goñi, G. Guarnieri, F. Guilhaumon, D. Kerstin, A. Kokkali, C.
347 Kruschel, V. Macic, L. Mangialajo, S. Mallol, E. Macpherson, A. Panucci, M. Radolovic, M.
348 Ramdani, P.. J. Schembri, A. Terlizzi, E. Villa, J. Claudet, How good is your marine protected

349 area at curbing threats?, *Biol. Conserv.* 221 (2018) 237–245.
350 <https://doi.org/10.1016/j.biocon.2018.03.013>.

351 [18] A.D. Mazaris, A. Kallimanis, E. Gissi, C. Pipitone, R. Danovaro, J. Claudet, G. Rilov, F.
352 Badalamenti, V. Stelzenmüller, L. Thiault, L. Benedetti-ecchi, P. Goriup, S. Katsanevakis, S.
353 Frascchetti, Threats to marine biodiversity in European protected areas, *Sci. Total Environ.* 677
354 (2019) 418–426. <https://doi.org/10.1016/j.scitotenv.2019.04.333>.

355 [19] M.D. Barnes, L. Glew, C. Wyborn, I.D. Craigie, Prevent perverse outcomes from global
356 protected area policy, *Nat. Ecol. Evol.* 2 (2018) 1–4. [https://doi.org/10.1038/s41559-018-](https://doi.org/10.1038/s41559-018-0501-y)
357 [0501-y](https://doi.org/10.1038/s41559-018-0501-y).

358 [20] M. Dureuil, K. Boerder, K.A. Burnett, R. Froese, B. Worm, Elevated trawling inside protected
359 areas undermines conservation outcomes in a global fishing hot spot, *Science* (80-.). 362
360 (2018) 1403–1407. <https://doi.org/10.1126/science.aau0561>.

361 [21] B. Horta e Costa, J. Claudet, G. Franco, K. Erzini, A. Caro, E.J. Gonçalves, A regulation-based
362 classification system for Marine Protected Areas (MPAs), *Mar. Policy.* 72 (2016) 192–198.
363 <https://doi.org/10.1016/j.marpol.2016.06.021>.

364 [22] M. Zupan, E. Fragkopoulou, J. Claudet, K. Erzini, B. Horta e Costa, E.J. Gonçalves, Marine
365 partially protected areas: drivers of ecological effectiveness, *Front. Ecol. Environ.* 16 (2018)
366 381–387. <https://doi.org/10.1002/fee.1934>.

367 [23] A.M. Friedlander, M.K. Donovan, H. Koike, P. Murakawa, W. Goodell, Characteristics of
368 effective marine protected areas in Hawai‘i, *Aquat. Conserv. Mar. Freshw. Ecosyst.* 29 (2019)
369 103–117. <https://doi.org/10.1002/aqc.3043>.

370 [24] J. Claudet, C. Loiseau, M. Sostres, M. Zupan, Underprotected Marine Protected Areas in a
371 Global Biodiversity Hotspot, *One Earth.* 2 (2020) 380–384.
372 <https://doi.org/10.1016/j.oneear.2020.03.008>.

- 373 [25] J. Claudet, France must impose strict levels of marine protection, *Nature*. 570 (2019) 36.
374 <https://doi.org/10.1038/d41586-019-01750-1>.
- 375 [26] M.J. Costello, M. Coll, R. Danovaro, P. Halpin, H. Ojaveer, P. Miloslavich, A census of marine
376 biodiversity knowledge, resources, and future challenges, *PLoS One*. 5 (2010) e12110-
377 <https://doi.org/10.1371/journal.pone.0012110>.
- 378 [27] D.P. Tittensor, C. Mora, W. Jetz, H.K. Lotze, D. Ricard, E. Vanden Berghe, B. Worm, Global
379 patterns and predictors of marine biodiversity across taxa, *Nature*. 466 (2010) 1098–1101.
380 <https://doi.org/10.1038/nature09329>.
- 381 [28] B.S. Halpern, M. Frazier, J. Potapenko, K.S. Casey, K. Koenig, C. Longo, J.S. Lowndes, R.C.
382 Rockwood, E.R. Selig, K.A. Selkoe, S. Walbridge, Spatial and temporal changes in cumulative
383 human impacts on the world’s ocean, *Nat. Commun.* 6 (2015) 7615.
384 <https://doi.org/10.1038/ncomms8615>.
- 385 [29] R Core Team, R: A Language and Environment for Statistical Computing. Vienna, Austria: R
386 Foundation for Statistical Computing; 2017. R Foundation for Statistical Computing, ... Free.
387 Available Internet [Http://Www. R-Project](http://www.R-project.org). (2017).
388 <https://scholar.google.co.in/scholar?hl=en&q=R+core+team+&btnG=#1%5Cnhttps://scholar.g>
389 [oogle.co.in/scholar?hl=en&q=R+core+team+&btnG=%238%5Cnhttps://scholar.google.co.in/s](https://scholar.google.co.in/scholar?hl=en&q=R+core+team+&btnG=%238%5Cnhttps://scholar.google.co.in/s)
390 [cholar?hl=en&q=R+core+team+&btnG=%232](https://scholar.google.co.in/scholar?hl=en&q=R+core+team+&btnG=%232).
- 391 [30] A. South, *rworldmap* : a new R package for mapping global data, *R J.* 3 (2011) 35.
392 <https://doi.org/10.32614/RJ-2011-006>.
- 393 [31] E. Pebesma, Simple Features for R: Standardized Support for Spatial Vector Data, *R J.* 10
394 (2018) 439. <https://doi.org/10.32614/RJ-2018-009>.
- 395 [32] M. Tennekes, *tmap* : Thematic Maps in R, *J. Stat. Softw.* 84 (2018).
396 <https://doi.org/10.18637/jss.v084.i06>.

- 397 [33] H. Wickham, L. Henry, tidy: Tidy Messy Data. R package version 1.0.2., (2020).
- 398 [34] H. Wickham, ggplot2, Springer New York, New York, NY, 2009. [https://doi.org/10.1007/978-0-](https://doi.org/10.1007/978-0-387-98141-3)
399 387-98141-3.
- 400 [35] M. Pieraccini, S. Coppa, G.A. De Lucia, Beyond marine paper parks? Regulation theory to
401 assess and address environmental non-compliance, *Aquat. Conserv. Mar. Freshw. Ecosyst.* 27
402 (2017) 177–196. <https://doi.org/10.1002/aqc.2632>.
- 403 [36] D.A. Gill, M.B. Mascia, G.N. Ahmadi, L. Glew, S.E. Lester, M. Barnes, I. Craigie, E.S. Darling,
404 C.M. Free, J. Geldmann, S. Holst, O.P. Jensen, A.T. White, X. Basurto, L. Coad, R.D. Gates, G.
405 Guannel, P.J. Mumby, H. Thomas, S. Whitmee, S. Woodley, H.E. Fox, Capacity shortfalls hinder
406 the performance of marine protected areas globally, *Nature*. 543 (2017) 665–669.
407 <https://doi.org/10.1038/nature21708>.
- 408 [37] A.M. Friedlander, J. Giddens, E. Ballesteros, S. Blum, E.K. Brown, J.E. Caselle, B. Henning, C.
409 Jost, P. Salinas-de-León, E. Sala, Marine biodiversity from zero to a thousand meters at
410 Clipperton Atoll (Île de La Passion), Tropical Eastern Pacific, *PeerJ*. 7 (2019) e7279.
411 <https://doi.org/10.7717/peerj.7279>.
- 412 [38] C. Quézel, S. Marinesque, D. Ringler, L. Fillinger, T. Changeux, C. Marteau, M. Troussellier, Iles
413 Eparses (SW Indian Ocean) as reference ecosystems for environmental research, *Acta*
414 *Oecologica*. 72 (2016) 1–8. <https://doi.org/https://doi.org/10.1016/j.actao.2015.12.012>.
- 415 [39] P. Leenhardt, B. Cazalet, B. Salvat, J. Claudet, F. Feral, The rise of large-scale marine protected
416 areas: Conservation or geopolitics?, *Ocean Coast. Manag.* 85 (2013) 112–118.
417 <https://doi.org/10.1016/j.ocecoaman.2013.08.013>.
- 418 [40] R. Devillers, R.L. Pressey, A. Grech, J.N. Kittinger, G.J. Edgar, T. Ward, R. Watson, Reinventing
419 residual reserves in the sea: Are we favouring ease of establishment over need for
420 protection?, *Aquat. Conserv. Mar. Freshw. Ecosyst.* 25 (2015) 480–504.

421 <https://doi.org/10.1002/aqc.2445>.

422 [41] A.J. Davies, J.M. Roberts, J. Hall-Spencer, Preserving deep-sea natural heritage: Emerging
423 issues in offshore conservation and management, *Biol. Conserv.* 138 (2007) 299–312.
424 <https://doi.org/https://doi.org/10.1016/j.biocon.2007.05.011>.

425 [42] H.B. Harrison, M. Bode, D.H. Williamson, M.L. Berumen, G.P. Jones, A connectivity portfolio
426 effect stabilizes marine reserve performance, *Proc. Natl. Acad. Sci.* (2020) 201920580.
427 <https://doi.org/10.1073/pnas.1920580117>.

428 [43] N.C. Ban, G.G. Gurney, N.A. Marshall, C.K. Whitney, M. Mills, S. Gelcich, N.J. Bennett, M.C.
429 Meehan, C. Butler, S. Ban, T.C. Tran, M.E. Cox, S.J. Breslow, Well-being outcomes of marine
430 protected areas, *Nat. Sustain.* 2 (2019) 524–532. <https://doi.org/10.1038/s41893-019-0306-2>.

431 [44] D.A. Gill, S.H. Cheng, L. Glew, E. Aigner, N.J. Bennett, M.B. Mascia, Social Synergies, Tradeoffs,
432 and Equity in Marine Conservation Impacts, *Annu. Rev. Environ. Resour.* 44 (2019) 347–372.
433 <https://doi.org/10.1146/annurev-environ-110718-032344>.

434 [45] M.C. Meehan, N.C. Ban, R. Devillers, G.G. Singh, J. Claudet, How far have we come? A review
435 of MPA network performance indicators in reaching qualitative elements of Aichi Target 11,
436 *Conserv. Lett.* (2020) e12746. <https://doi.org/10.1111/conl.12746>.

437 [46] L. Morgan, E. Pike, R. Moffitt, How much of the ocean is protected?, *Biodiversity.* 19 (2018)
438 148–151. <https://doi.org/10.1080/14888386.2018.1469432>.

439 [47] S. Wells, P.F.E. Addison, P.A. Bueno, M. Costantini, A. Fontaine, L. Germain, T. Lefebvre, L.
440 Morgan, F. Staub, B. Wang, A. White, M.X. Zorrilla, Using the IUCN Green List of Protected and
441 Conserved Areas to promote conservation impact through marine protected areas, *Aquat.*
442 *Conserv. Mar. Freshw. Ecosyst.* 26 (2016) 24–44. <https://doi.org/10.1002/aqc.2679>.

443 [48] C.M. Roberts, B.C. O’Leary, D.J. McCauley, P.M. Cury, C.M. Duarte, J. Lubchenco, D. Pauly, A.
444 Sáenz-Arroyo, U.R. Sumaila, R.W. Wilson, B. Worm, J.C. Castilla, Marine reserves can mitigate

445 and promote adaptation to climate change, *Proc. Natl. Acad. Sci.* 114 (2017) 6167–6175.
446 <https://doi.org/10.1073/pnas.1701262114>.

447 [49] M. Di Lorenzo, P. Guidetti, A. Di Franco, A. Calò, J. Claudet, Assessing spillover from marine
448 protected areas and its drivers: A meta-analytical approach, *Fish Fish.* 21 (2020) 906–915.
449 <https://doi.org/10.1111/faf.12469>.

450 [50] G.J. Edgar, R.D. Stuart-Smith, T.J. Willis, S. Kininmonth, S.C. Baker, S. Banks, N.S. Barrett, M. a.
451 Becerro, A.T.F. Bernard, J. Berkhout, C.D. Buxton, S.J. Campbell, A.T. Cooper, M. Davey, S.C.
452 Edgar, G. Försterra, D.E. Galván, A.J. Irigoyen, D.J. Kushner, R. Moura, P.E. Parnell, N.T. Shears,
453 G. Soler, E.M. a. Strain, R.J. Thomson, Global conservation outcomes depend on marine
454 protected areas with five key features, *Nature.* 506 (2014) 216–220.
455 <https://doi.org/10.1038/nature13022>.

456 [51] B.C. O’Leary, M. Winther-Janson, J.M. Bainbridge, J. Aitken, J.P. Hawkins, C.M. Roberts,
457 Effective Coverage Targets for Ocean Protection, *Conserv. Lett.* 9 (2016) 398–404.
458 <https://doi.org/10.1111/conl.12247>.

459 [52] R.A. Magris, R.L. Pressey, Marine protected areas: Just for show?, *Science* (80-.). 360 (2018)
460 723 LP – 724. <http://science.sciencemag.org/content/360/6390/723.2.abstract>.

461 [53] J.E. Cramp, C.A. Simpfendorfer, R.L. Pressey, Beware silent waning of shark protection,
462 *Science* (80-.). 360 (2018) 723 LP – 723. <https://doi.org/10.1126/science.aat3089>.

463 [54] A.N. Rife, B. Erisman, A. Sanchez, O. Aburto-Oropeza, When good intentions are not
464 enough...Insights on networks of “paper park” marine protected areas, *Conserv. Lett.* 6 (2013)
465 200–212. <https://doi.org/10.1111/j.1755-263X.2012.00303.x>.

466 [55] C.J. Lemieux, P.A. Gray, R. Devillers, P.A. Wright, P. Dearden, E.A. Halpenny, M. Groulx, T.J.
467 Beechey, K. Beazley, How the race to achieve Aichi Target 11 could jeopardize the effective
468 conservation of biodiversity in Canada and beyond, *Mar. Policy.* 99 (2019) 312–323.

469 <https://doi.org/https://doi.org/10.1016/j.marpol.2018.10.029>.

470 [56] T. Agardy, J. Claudet, J.C. Day, 'Dangerous Targets' revisited: Old dangers in new contexts
471 plague marine protected areas, *Aquat. Conserv. Mar. Freshw. Ecosyst.* 26 (2016) 7–23.
472 <https://doi.org/10.1002/aqc.2675>.

473 [57] R. Devillers, C.J. Lemieux, P.A. Gray, J. Claudet, Canada's uncharted conservation approach,
474 *Science (80-.)*. 364 (2019) 1243–1243. <https://doi.org/10.1126/science.aax9060>.

475 [58] B.P. Visconti, S.H.M. Butchart, T.M. Brooks, P.F. Langhammer, D. Marnewick, S. Vergara, A.
476 Yanosky, J.E.M. Watson, Protected area targets post-2020, *Science (80-.)*. 364 (2019) 239–
477 241. <https://doi.org/10.1126/science.aav6886>.

478 [59] M.J. Costello, B. Ballantine, Biodiversity conservation should focus on no-take Marine
479 Reserves: 94% of Marine Protected Areas allow fishing, *Trends Ecol. Evol.* 30 (2015) 507–509.
480 <https://doi.org/10.1016/j.tree.2015.06.011>.

481 [60] V.M. Adams, G.D. Iacona, H.P. Possingham, Weighing the benefits of expanding protected
482 areas versus managing existing ones, *Nat. Sustain.* 2 (2019) 404–411.
483 <https://doi.org/10.1038/s41893-019-0275-5>.

484

485 Appendices

486 Table A1: Protected area (km²) by protection level and per French Territory (see Figure 5 from main text).

487

	Surface EEZ (km ²)	Number of MPA	Number of zones	Protected area						
				Total (km ²)	Fully (km ²)	Highly (km ²)	Moderately (km ²)	Poorly (km ²)	Unprotected (km ²)	Not Regulated (km ²)
Total	10 193 037.00	524	564	3 430 387.3	160 015.9	993.8	1 534 725.2	1 304 751.4	318 137.9	111 763.2
Metropolitan France	345 224.00	340	358	153 598.5	94.5	19.9	140.5	6 921.0	61 443.4	84 979.2
Atlantic/Channel/North Sea	257 636.00	256	259	101 860.7	12.4	7.9	11.4	10.6	19 393.8	82 424.6
Mediterranean Sea	87 588.00	84	99	51 737.8	82.1	12.1	129.1	6 910.4	42 049.6	2 554.5
France overseas	9 847 813.00	184	206	3 276 788.9	159 921.3	973.8	1 534 584.8	1 297 830.3	256 694.5	26 784.0
Atlantic Ocean	288 771.00	61	71	144 969.3	172.4	25.8	-	2.6	144 202.2	566.3
Guadeloupe	91 013.00	33	33	91 012.9	41.9	-	-	-	90971	-
Martinique	47 958.00	10	12	47 958.0	1.1	3.2	-	2.6	47 951.1	-
Saint-Barthélemy	4 193.00	2	4	4 193.1	2.5	22.6	-	-	4 168.0	-
Saint-Martin	1 103.00	9	9	1 102.7	33.7	-	-	-	1 069.0	-
French Guiana	132 120.00	9	12	688.5	93.20	-	-	-	43.1	552.2
Saint-Pierre And Miquelon	12 384.00	1	1	14.1	-	-	-	-	-	14.1
Pacific Ocean	6 904 777.00	105	112	1 356 629.3	30 194.9	945.8	10.2	1 297 820.0	3 580.4	24 077.9
French Polynesia	4 781 060.00	47	54	4 142.8	391.1	908.5	10.2	-	2 766.6	66.4
New Caledonia	1 422 543.00	57	57	1 350 675.1	27 992.5	37.3	-	1 297 820.0	813.8	24 011.5
Clipperton	437 420.00	1	1	1 811.4	1 811.4	-	-	-	-	-
Wallis and Futuna	263 754.00			-	-	-	-	-	-	-
Indian Ocean	2 654 265.00	18	23	1 775 190.3	129 554.0	2.2	1 534 574.6	7.7	108 911.9	2 139.9
Mayotte	66 990.00	11	11	66 990.0	-	2.2	28.0	-	66 956.0	3.8
La Réunion	315 982.00	1	4	35.1	2.0	-	9.6	7.7	15.8	-
French Southern and Antarctic Lands	2 271 293.00	6	8	1 708 165.2	129 552.0	-	1534537.00	-	41 940.1	2 136.1

488

489

490 Table A2: Protected area (km²) by protection level and per marine habitats.

491

492

493

Habitats	EUNIS	Habitats area	Protected area					Unprotected	Not regulated
			Total	Fully	Highly	Moderately	Poorly		
Metropole									
French Atlantic, Channel and North sea									
Littoral rock and other hard substrata	A1	386.47	272.40	-	2.05	0.53	0.19	153.65	115.97
Littoral sediment	A2	1 253.95	972.20	1.43	32.11	2.88	8.13	492.35	435.30
Littoral mud	A2.3	358.73	346.71	1.48	-	26.28	1.63	225.18	92.14
Atlantic and Mediterranean high energy infralittoral rock	A3.1	795.38	588.30	-	-	1.84	-	440.06	146.40
Atlantic and Mediterranean moderate energy infralittoral rock	A3.2	1 020.60	573.55	-	0.94	-	-	310.20	262.41
Atlantic and Mediterranean low energy infralittoral rock	A3.3	589.24	305.19	-	-	0.00	-	73.70	231.50
Atlantic and Mediterranean high energy circalittoral rock	A4.1	405.26	167.07	-	-	-	-	167.07	-
Atlantic and Mediterranean moderate energy circalittoral rock	A4.2	1 370.04	506.67	-	-	-	-	383.96	122.72
Atlantic and Mediterranean low energy circalittoral rock	A4.3	2 531.52	846.38	-	-	-	-	662.09	184.29
Sublittoral coarse sediment	A5.1	54 318.18	11 731.06	-	0.05	-	-	5 102.20	6 628.81
Sublittoral sand	A5.2	56 693.69	14 874.41	-	0.69	11.99	-	6 156.17	8 705.56
Sublittoral mud	A5.3	5 478.09	2 476.91	-	-	12.23	-	1 515.79	948.89
Sublittoral mixed sediments	A5.4	44 074.73	11 597.10	-	-	-	-	3 690.35	7 906.75
Mediterranean Sea									
Atlantic and Mediterranean high energy infralittoral rock	A3.1	104.78	94.30	2.05	0.65	0.08	11.98	68.00	11.55
Atlantic and Mediterranean moderate energy circalittoral rock	A4.2	260.73	121.46	0.37	-	-	29.64	84.15	7.29
Sublittoral coarse sediment	A5.1	106.06	100.16	0.70	0.01	0.02	3.12	87.39	8.92
Sublittoral sand	A5.2	763.79	693.63	0.02	0.52	0.79	23.54	256.99	411.77
Sublittoral mud	A5.3	6 787.30	2 809.59	-	1.76	-	2.13	1 366.64	1 439.05
Sublittoral mixed sediments	A5.4	12 955.38	7 366.08	10.26	2.67	0.98	758.44	6 152.11	441.63
Sublittoral macrophyte-dominated sediment	A5.5	897.39	813.01	4.71	0.07	1.09	105.88	680.29	20.97
Deep-sea mixed substrata	A6.2	2 143.49	1 128.36	-	-	-	6.59	1 119.30	2.46
Deep-sea sand	A6.3	3 928.39	2 297.42	-	-	-	1 156.11	1 137.44	3.87
Deep-sea muddy sand	A6.4	5 567.90	3 955.62	-	-	-	464.07	3 491.55	-
Deep-sea mud	A6.5	113 598.78	32 433.14	-	-	-	5 262.06	27 095.33	75.76
Deep-sea bioherms	A6.6	43.43	40.00	-	-	-	27.47	12.52	-
Overseas									
Guadeloupe	Coral reefs	/	113.30	113.30	6.50	-	-	106.80	-
Martinique	Coral reefs	/	72.00	72.00	0.90	-	-	71.10	-
Saint-Barthelemy	Coral reefs	/	10.70	10.70	1.40	7.90	-	1.40	-
Saint-Martin	Coral reefs	/	6.20	6.20	5.20	-	-	1.00	-
Mayotte	Coral reefs	/	294.26	300.00	5.60	0.30	4.60	283.76	-
Reunion	Coral reefs	/	12.12	12.12	2.00	-	9.62	0.50	-
French Southern an Antarctic lands	Coral reefs	/	113.9	31.86	26.04	-	-	-	5.82
New-Caledonia	Coral reefs	/	4 576.83	4 574.80	1 786.00	3.40	-	2 143.50	252.70
Clipperton	Coral reefs	/	4.30	4.30	4.30	-	-	-	-
French Polynesia	Coral reefs	/	3072.09	540.40	16.20	91.00	2.00	388.70	42.50
Wallis & Futuna	Coral reefs	/	410.99	0.00	-	-	-	-	-